



RESPONSE UNDER 37 CFR 1.116  
EXPEDITED PROCEDURE EXAMINING  
GROUP 1754

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF

SATOSHI HIRAHARA ET AL.

: EXAMINER: LISH, PETER J.

SERIAL NO: 10/040,419

:

FILED: JANUARY 9, 2002

: GROUP ART UNIT: 1754

FOR: ACTIVATED CARBON FOR USE  
IN ELECTRIC DOUBLE LAYER  
CAPACITORS

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This Request for Reconsideration responds to the Examiner's Official Action and Final Rejection, mailed December 30, 2004.

Applicants acknowledge with appreciation the Examiner's withdrawal of the rejections over Alford, Baker et al., and Winnerberg as explained on page 2 of the Examiner's Office Action. Applicants' counsel also appreciates the very precise and complete Office Action in which the Examiner set forth his position in a clear and understandable manner. While counsel disagrees with the Examiner's position, it in no way takes away from the clear and precise exposition thereof.

Claims 1-2, 4-22 and 30 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Adachi et al., U.S. Patent No. 5,430,606. This rejection is respectfully traversed.

It appears that the Examiner is reading more into the Adachi et al. reference than exists therein. On this point, applicants note that the Examiner makes the following statement:

However, nowhere does Adachi et al. explicitly teach that the use of higher temperatures is undesirable. Furthermore, it is noted that the capacitance of carbons 2-8 and 2-9 in Table 2, which are heated at 700° C or greater, are very close to those of carbons 2-2 to 2-4, which are heated at temperatures between 400 and 500 °C. Therefore, it is not seen how the applicants have determined that the high surface area carbons of Adachi et al. are undesirable. (Office Action, page 3).

The Examiner's attention is specifically directed to (1) Claim 1 of Adachi and (2) column 3, lines 6-10. Adachi's only claim reads as follows:

1. An electric double layer capacitor unit cell having, as a polarizable electrode, carbonaceous material obtained by heat-treating in sodium hydroxide **at a temperature of 400° to 500% C.** an activated carbon precursor **which is one having been subjected to carbonization treatment 800° to 950° C.** (Emphasis added.)

It is clear from the claim that despite the range of heat treatment set forth in the Examples of the Adachi reference, Adachi desired and claimed only heat-treating in sodium hydroxide at a temperature of 400° to 500° C. Moreover, despite the plethora of statements regarding carbonization of the carbonaceous material at the other temperatures, the only claim requires the carbonization treatment to have been conducted at 800° to 950° C.

As the Examiner recognizes, Adachi claimed heat treating using sodium hydroxide at a temperature of 400° to 500° C. This temperature was said by Adachi to be "critical." On this point, kindly note col. 3, lines 6-10 wherein it is stated:

When sodium hydroxide or potassium hydroxide is used as the alkali metal hydroxide and the heat treatment temperature is elevated, a **critical increase in capacitance is found in the vicinity of 500° C and 450° C.** (Emphasis added.)

Accordingly, it is clear that Adachi et al. considered the heat treatment range of 450° to 500° C. to effect a critical change in the properties. It is this range that is claimed.

Further, Adachi's claim requires that the activated carbon precursor be one which has been subjected to carbonization treatment of 800° to 950° C. It should be noted that the data in Table 2 of Adachi (col. 4) does not depict results achieved wherein coconut shells are carbonized at 800° to 950° C. Indeed, the coconut shells of Table 2 are carbonized by heating at only 650° C. for one hour.

Assuming, *arguendo*, one could dismiss the fact that Example 2 is working with the coconut shells carbonized at an unpreferred carbonization temperature, it is clear that at the heat treatment temperature which is said to be "critical" by Adachi, 400° to 500° C, the resultant material has a BET surface area much smaller than that claimed by applicants. At 400° to 500° C, Adachi's BET surface area is only 370 to 649 m<sup>2</sup>/g, whereas applicants claim a product having a BET surface area of 200 m<sup>2</sup>/g to 2500 m<sup>2</sup>/g.

Admittedly, Adachi did treat the carbonized coconut shells with sodium hydroxide at a temperature in the range 700° - 800° C and did obtain a somewhat higher surface area at that temperature. However, Adachi chose not to recommend and claim these treatment conditions.

There may be a good reason for Adachi not recommending and claiming the higher heat treatment temperature using sodium hydroxide. That reason is set forth in Table 7, col. 6 of Adachi. Table 7 points out that coconut shells were carbonized by heating at temperatures ranging from 400° - 1,000° C for one hour at each temperature. These carbonized material were then mixed with sodium hydroxide and heated at Adachi's preferred temperature of 450° C. The data in table 7 shows that when carbonization is carried out at 800° to 950° C, the capacitance is less than when carbonization is carried out at 650° C but the internal resistance is also significantly less. Compare Examples 6-2 through 6-7 with Examples 6-10 through 6-13.) In other words,

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it appears that Adachi selected the condition of Examples 6-10 to 6-13 because of the low internal resistance.

It is respectfully submitted that one of ordinary skill in the art having the entire disclosure of Adachi before him would not operate under conditions which achieved the very high BET surface area claimed in applicants' claims.

It is respectfully submitted that several of applicants' claims require the coconut shells to be heat treated in the presence of steam. Adachi et al. heat treats solely in the presence of sodium hydroxide and does not suggest the use of steam. The Examiner has taken the position that the steam limitation is a "process limitation" and that "the applicants disclosed the use of either steam or chemical activation means in their disclosure." It is respectfully submitted that the Examiner is not permitted to use applicants' own teachings against them.

Admittedly, applicants have taught that although steam is a preferred method of activation, activation can be accomplished using chemical means. However, the use of chemical means must be such that the product produced meets the limitations of applicants' claims, i.e., (1) the activated carbon has a BET specific surface area of 2,000 m<sup>2</sup>/g to 2,500 m<sup>2</sup>/g; (2) has an "average pore diameter of 1.95 nm (19.5 Å) to 2.20 nm (22 Å); (3) has a volume of pores having a pore diameter, as calculated according to a Cranston-Inkley method, of 5.0 nm (50 Å) to 30.0 nm (300 (Å) is 0.05 cm<sup>3</sup>/g, and (4) the activated carbon exhibits a rest potential versus a lithium electrode of 2.85 to 3.03 V in a nonaqueous electrolytic solution. (Indeed, the Adachi reference does not appear to discuss pore volume.)

It should be noted that applicants achieved the above characteristics via a steam activation procedure. The Adachi et al. reference does not recommend using an alkali

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metal hydroxide treatment to achieve the results achieved by applicants. Because there is no suggestion in the Adachi reference to make the product claimed by applicants and, especially to make that product using steam, it is respectfully submitted that the Adachi reference does not anticipate and does not make obvious the claimed invention.

It is respectfully submitted that the claims of this application as amended are now in condition for allowance and early indication of allowability is requested.

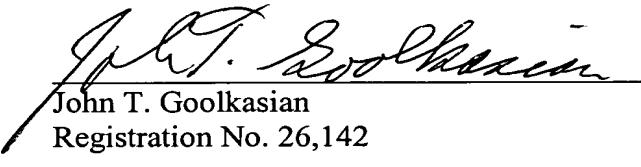
Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

Customer Number

22850

Tel: (703) 413-3000  
Fax: (703) 413-2220  
(OSMMN 08/03)



John T. Goolkasian  
Registration No. 26,142